Application Serial No. 09/327,756 filed June 7, 1999[, which is a Continuation-in-Part of Application Serial No. 09/305,896 filed May 5, 1999, which is a Continuation-in-Part of copending Application No. 09/275,518 filed March 24, 1999, which is a Continuation-in-Part of copending Application Nos.: 09/274,265 filed March 22, 1999; 09/243,078 filed February 2, 1999; 09/241,930 filed February 2, 1999; 09/157,778 filed September 21, 1998; 09/047,146 filed March 24, 1998, 08/949,915 filed October 14, 1997, now U.S. Letters Patent 6,158,659; 08/854,832 filed May 12, 1997, now U.S. Letters Patent 6,085,978; 08/886,806 filed April 22, 1997, now U.S. Letters Patent 5,984,185; 08/726,522 filed October 7, 1996, now U.S. Letters Patent 6,073,846; 08/573,949 filed December 18, 1995, now abandoned]; each said application being commonly owned by Assignee, Metrologic Instruments, Inc., of Blackwood, New Jersey, and incorporated herein by reference as if fully set forth herein.

AMENDMENT OF THE CLAIMS TO INVENTION

Please cancel Claims 1-262 without prejudice or disclaimer and add Claims 263-268 as follows:

--263. An LED-based planar light illumination (PLIM) chip for use in a PLIIM-based system, comprising:

a semiconductor substrate supporting a linear-type light emitting diode (LED) array including an array of LEDs, each having a light emitting source;

a focusing-type microlens array having an array of focusing lenslets aligned in spatial registration with said array of LEDs;

a collimating type microlens array having an array of collimating lenslets aligned in spatial registration with said array of LEDs and said array of focusing lenslets;

an IC package having a light transmission window, for containing said semiconductor substrate, said focusing-type microlens array, and said collimating-type microlens array,

wherein each focusing lenslet focuses a reduced-size image of the light emitting source of an LED in said LED array, towards a focal point above said focusing-type microlens array;

wherein each collimating lenslet collimates the light rays associated with the reduced size image of the corresponding light emitting source; and

wherein each cylindrical lenslet diverges the collimated light beam so as to produce a spatially-coherent planar light illumination beam (PLIB) component, which collectively produce a composite PLIB from the LED-based PLIM.--

--264. An LED-based PLIM chip for use in a PLIIM-based system having a relatively short working distance, comprising: a linear-type light emitting diode (LED) array (A), a focusing-type microlens array (B), collimating type microlens array (C), and a cylindrical-type microlens array (D), wherein each are mounted within the IC package of the PLIM chip, for use in object illumination producing a spatially-incoherent planar light illumination beam (PLIB) therefrom.--

--265. An optical process carried within the LED-based PLIM, wherein (1) the focusing lens element focuses a reduced-size image of the light emitting source of the LED towards a focal point within the barrel structure, (2) the collimating lens element collimates the light rays associated with the reduced-size image of the light emitting source, and (3) the cylindrical lens element diverges (i.e. spreads) the collimated light beam so as to produce a spatially-incoherent planar light illumination beam (PLIB).--

--266. An optical process carried within the LED-based PLIM, wherein (1) each focusing lenslet focuses a reduced-size image of a light emitting source of an LED towards a focal point above the focusing-type microlens array, (2) each collimating lenslet collimates the light rays associated with the reduced-size image of the light emitting source, and (3) each cylindrical lenslet diverges the collimated light beam so as to produce a spatially-incoherent planar light illumination beam (PLIB) component, which collectively produce a composite spatially-incoherent PLIB from the LED-based PLIM.--

--267. A LED-based PLIM is realized as an array of components, contained within a miniature IC package, namely:

a linear-type light emitting diode (LED) array, on a semiconductor substrate, providing a linear array of light emitting sources (having the narrowest size and dimension possible);

a focusing-type microlens array, mounted above and in spatial registration with the LED array, providing a focusing-type lenslet above and in registration with each light emitting source, and projecting a reduced image of the light emitting source at its focal point above the LED array;

a collimating-type microlens array, mounted above and in spatial registration with the focusing-type microlens array, providing each focusing lenslet with a collimating-type lenslet for collimating the light rays associated with the reduced image of each light emitting device;

a cylindrical-type microlens array, mounted above and in spatial registration with the collimating-type micro-lens array, providing each collimating lenslet with a linear-diverging type

lenslet for producing a spatially-incoherent planar light illumination beam (PLIB) component from each light emitting source; and

an IC package containing the above-described components in the stacked order described above, and having a light transmission window through which the spatially-incoherent PLIB is transmitted towards the target object being illuminated.--

--268. A LED-based PLIM realized within an IC package design comprising:

a light emitting diode (LED) providing a light emitting source (having the narrowest size and dimension possible) on a semiconductor substrate;

focusing lenslet, mounted above and in spatial registration with the light emitting source, for projecting a reduced image of the light emitting source at its focal point, which is preferably set by the further working distance required by the application at hand;

a cylindrical-type microlens, mounted above and in spatial registration with the collimating-type microlens, for producing a spatially-incoherent planar light illumination beam (PLIB) from the light emitting source; and

an IC package containing the above-described components in the stacked order described above, and having a light transmission window through which the composite spatially-incoherent PLIB is transmitted towards the target object being illuminated.--

REQUIREMENT UNDER 37 C.F.R. 1.121

As required under 37 C.F.R. 1.121 a clean version of the first paragraph of Page 1 of the Specification is as follows:

This is a Continuation of Application No. 09/954,477 filed September 17, 2001, which is a Continuation-in-Part of: copending Application Serial No. 09/721,885 filed November 24, 2000; International Application PCT/US00/15624 filed June 7, 2000, published as WIPO Publication WO 00/75856; Application Serial No. 09/327,756 filed June 7, 1999; each said application being commonly owned by Assignee, Metrologic Instruments, Inc., of Blackwood, New Jersey, and incorporated herein by reference as if fully set forth herein.

Also as required under 37 C.F.R. 1.121, a clean set of the amended Claims is as follows:

263. An LED-based planar light illumination (PLIM) chip for use in a PLIIM-based system, comprising:

a semiconductor substrate supporting a linear-type light emitting diode (LED) array including an array of LEDs, each having a light emitting source;

a focusing-type microlens array having an array of focusing lenslets aligned in spatial registration with said array of LEDs;

a collimating type microlens array having an array of collimating lenslets aligned in spatial registration with said array of LEDs and said array of focusing lenslets;

an IC package having a light transmission window, for containing said semiconductor substrate, said focusing-type microlens array, and said collimating-type microlens array,

wherein each focusing lenslet focuses a reduced-size image of the light emitting source of an LED in said LED array, towards a focal point above said focusing-type microlens array;

wherein each collimating lenslet collimates the light rays associated with the reduced size image of the corresponding light emitting source; and

wherein each cylindrical lenslet diverges the collimated light beam so as to produce a spatially-coherent planar light illumination beam (PLIB) component, which collectively produce a composite PLIB from the LED-based PLIM.

264. An LED-based PLIM chip for use in a PLIIM-based system having a relatively short working distance, comprising: a linear-type light emitting diode (LED) array (A), a focusing-type microlens array (B), collimating type microlens array (C), and a cylindrical-type microlens array (D), wherein each are mounted within the IC package of the PLIM chip, for use in object illumination producing a spatially-incoherent planar light illumination beam (PLIB) therefrom.

265. An optical process carried within the LED-based PLIM, wherein (1) the focusing lens element focuses a reduced-size image of the light emitting source of the LED towards a focal point within the barrel structure, (2) the collimating lens element collimates the light rays associated with the reduced-size image of the light emitting source, and (3) the cylindrical lens element diverges (i.e. spreads) the collimated light beam so as to produce a spatially-incoherent planar light illumination beam (PLIB).

266. An optical process carried within the LED-based PLIM, wherein (1) each focusing lenslet focuses a reduced-size image of a light emitting source of an LED towards a focal point above the focusing-type microlens array, (2) each collimating lenslet collimates the light rays

associated with the reduced-size image of the light emitting source, and (3) each cylindrical lenslet diverges the collimated light beam so as to produce a spatially-incoherent planar light illumination beam (PLIB) component, which collectively produce a composite spatially-incoherent PLIB from the LED-based PLIM.

267. A LED-based PLIM is realized as an array of components, contained within a miniature IC package, namely:

a linear-type light emitting diode (LED) array, on a semiconductor substrate, providing a linear array of light emitting sources (having the narrowest size and dimension possible);

a focusing-type microlens array, mounted above and in spatial registration with the LED array, providing a focusing-type lenslet above and in registration with each light emitting source, and projecting a reduced image of the light emitting source at its focal point above the LED array;

a collimating-type microlens array, mounted above and in spatial registration with the focusing-type microlens array, providing each focusing lenslet with a collimating-type lenslet for collimating the light rays associated with the reduced image of each light emitting device;

a cylindrical-type microlens array, mounted above and in spatial registration with the collimating-type micro-lens array, providing each collimating lenslet with a linear-diverging type lenslet for producing a spatially-incoherent planar light illumination beam (PLIB) component from each light emitting source; and

an IC package containing the above-described components in the stacked order described above, and having a light transmission window through which the spatially-incoherent PLIB is transmitted towards the target object being illuminated.

268. A LED-based PLIM realized within an IC package design comprising:

a light emitting diode (LED) providing a light emitting source (having the narrowest size and dimension possible) on a semiconductor substrate;

focusing lenslet, mounted above and in spatial registration with the light emitting source, for projecting a reduced image of the light emitting source at its focal point, which is preferably set by the further working distance required by the application at hand;

a cylindrical-type microlens, mounted above and in spatial registration with the collimating-type microlens, for producing a spatially-incoherent planar light illumination beam (PLIB) from the light emitting source; and

an IC package containing the above-described components in the stacked order described above, and having a light transmission window through which the composite spatially-incoherent PLIB is transmitted towards the target object being illuminated.